United States Patent [19]

Saxe

[11] **4,273,422**

[45] **Jun. 16, 1981**

[54] **LIGHT VALVE CONTAINING LIQUID SUSPENSION INCLUDING POLYMER STABILIZING SYSTEM**

[75] Inventor: **Robert L. Saxe,** New York, N.Y.

[73] Assignee: **Research Frontiers Incorporated,** Plainview, N.Y.

[21] Appl. No.: **17,453**

[22] Filed: **Mar. 5, 1979**

Related U.S. Application Data

[60] Continuation-in-part of Ser. No. 932,512, Aug. 10, 1978, Pat. No. 4,164,365, which is a division of Ser. No. 596,198, Jul. 15, 1977, abandoned, which is a continuation-in-part of Ser. No. 476,106, Jun. 3, 1974, abandoned, which is a continuation-in-part of Ser. No. 276,796, Jul. 31, 1972, abandoned.

[51] **Int. Cl.**[3] **G02F 1/00;** G02F 1/17

[52] **U.S. Cl.** **350/362;** 252/408

[58] **Field of Search** 252/408; 350/150, 151, 350/362, 356

[56] **References Cited**

U.S. PATENT DOCUMENTS

1,955,923	4/1934	Land	350/362
3,232,903	2/1966	Schmidle et al.	260/33.6
3,317,635	5/1967	Osmond	260/34.2
3,328,110	6/1967	Berger et al.	350/362
3,393,162	7/1968	Cox et al.	260/33.6
3,397,166	8/1968	Schmidle et al.	260/33.6
3,433,753	3/1969	Farkas et al.	260/34.2
3,454,518	7/1969	Kelly	260/31.4
3,505,268	4/1970	Backhouse et al.	260/31.2
3,512,876	5/1970	Marks	350/362
3,532,662	1/1970	Ansdell	260/34.2
3,557,007	1/1971	Collins et al.	260/33.8 R
3,580,880	5/1971	Clarke et al.	260/34.2
3,655,267	4/1972	Forlini	350/362
3,708,219	1/1973	Forlini et al.	350/362
3,723,151	3/1973	Backhouse et al.	260/34.2
3,743,382	7/1973	Rosenberg	350/362
3,788,996	1/1974	Thompson	260/34.2
3,891,572	6/1975	Moody et al.	252/316
4,025,163	5/1977	Saxe et al.	350/362
4,078,856	3/1978	Thompson et al.	350/362
4,113,362	9/1978	Saxe et al.	350/362

Primary Examiner—Teddy S. Gron

Attorney, Agent, or Firm—Jacobs & Jacobs

[57] **ABSTRACT**

A light valve for controlling the transmission of radiation, which comprises a cell and a liquid suspension in said cell; said liquid suspension comprising:

an electrically resistive liquid suspending medium;

a plurality of small, anisometrically shaped particles suspended in said suspending medium;

a copolymer of at least two different monomers, at least one of said monomers having a sterically unhindered functional group for bonding to or associating with said particles, and at least one of said monomers having a branched group, the distance from the backbone of the copolymer to said sterically unhindered functional group most distant from the backbone being less than the distance from the backbone to the terminal group of said branched group, the branched groups in said copolymer being sufficiently soluble so that the copolymer as a whole is substantially dissolved in said liquid suspending medium; and

a polymer dissolved in said liquid suspending medium and bonded to or associated with said copolymer but not said particles; the amount of said copolymer and said associated polymer being at least sufficient to inhibit agglomeration of said particles.

29 Claims, No Drawings